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NEW AND OLD PROOFS OF THE PYTHAGOREAN THEOREM.

By BENJ. F. YANNEY, A. M., Mount Union College, Alliance, Ohio, and JAMES A. CALDERHEAD, B. Sc., Curry University, Pittsburg, Pennsylvania.

[Continued from June-July Number.]

XLVI. Fig. 27.

$ABLN$ is equivalent to $ABMK$ is equivalent to $ACIK$.

$NLFH = ABPO$ is equivalent to $BEDC$.

$\therefore ABFH$ is equivalent to $ACIK + BEDC$.

XLVII. Fig. 27.

$ABLN$ is equivalent to $ACIK$.

$NLPO$ is equivalent to $STER$ is equivalent to $MTERC + QFD$.

$OPIH$ is equivalent to $REFH$ is equivalent to $REFQ + MBT$.

$\therefore ABFH$ is equivalent to $ACIK + BEDC$.

XLVIII. Fig. 27.

$AVUH$ is equivalent to $2ACH$ is equivalent to $ACIK$.

$VBFU$ is equivalent to $2CBF$ is equivalent to $BEDC$.

$\therefore ABFH$ is equivalent to $ACIK + BEDC$.

Wipper.

XLIX. Fig. 27.

$ABWX$, the half of $ABFH$, is equivalent to $ABC + CBW + CXA$.

But $ABC = BEF$ (is equivalent to $BWE + AXK$).

$\therefore ABWX$ is equivalent to $CBE + CAK$.

$\therefore ABFH$ is equivalent to $ACIK + BEDC$.

L. Fig. 27.

$Bzy = FDQ$. $AzyC = AJIK$. $ARH = BEF$. $HRQ = ACJ$.

$\therefore ABFH$ is equivalent to $ACIK + BEDC$.

LI. Fig. 27.

$ABC = BEF$. $CRa = FDQ$. $HRQ = IKG$. $HJCa$ is equivalent to $IGAJ$.

$\therefore ABFH$ is equivalent to $ACIK + BEDC$.

That $HJCa$ is equivalent to $IGAJ$ is evident for the following reasons: $\triangle ACH$ is equivalent to $\triangle ACI$, having the same base, and equal altitudes.

Hence, subtracting $\triangle ACJ$, which is common to both, we have $\triangle CJH$ is equivalent to $\triangle AJI$.

$\therefore HJCa$ is equivalent to $IGAJ$.

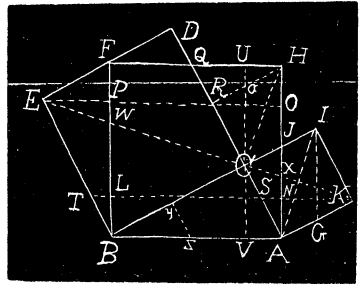


Fig. 27.

LII. Fig. 28.

$ABC = BEF$. $HRQ = ACJ$. $ARH = HKA$ is equivalent to $AKIJ + FDQ$.
 $\therefore ABFH$ is equivalent to $ACIK + BEDC$.

LIII. Fig. 28.

$AMNH$ is equivalent to $ACLH$ is equivalent to $ACIK$.

So, $MBFN$ is equivalent to $BEDC$.

$\therefore ABFH$ is equivalent to $ACIK + BEDC$.

Wipper.

LIV. Fig. 28.

$CLOJ$ is equivalent to $CLHA$ is equivalent to $ACIK$.

$BFLC$ is equivalent to $BEDC$.

But $ABFH$ is equivalent to $BFOJ$.

$\therefore ABFH$ is equivalent to $ACIK + BEDC$.

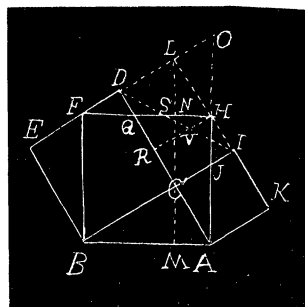


Fig. 28.

Hoffmann, 1800.

LV. Fig. 28.

$ABFH + BEF + FLH + HKA$ is equivalent to $ACIK + BEDC + ABC + CIL + CLD$.

$\therefore ABFH$ is equivalent to $ACIK + BEDC$.

LVI. Fig. 28.

$ABC = BEF$. $ICD = AKH$ is equivalent to $AKIJ + FDQ$.

$SVH = SQD$, and $VHT = IJT$.

\therefore By properly combining and substituting, $ABFH$ is equivalent to $ACIK + BEDC$.

LVII. Fig. 28.

$RDLH = ACIK$. $ARH = BEF$. $ABC = HFL$.

$\therefore ABFH$ is equivalent to $ACIK + BEDC$.

[To be Continued.]

EUCLIDEAN GEOMETRY WITHOUT DISPUTED AXIOMS.

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(a)

PROPOSITION I. *If two straight lines in the same plane be perpendicular to the same straight line they are parallel.*

Prove by Axiom 11, and I, 27.*

*These and the subsequent numbers refer to the Book and Proposition in Todhunter's Euclid.